ABSTRACT OF THE DISCLOSURE

A high-capacity hydrogen storage alloy has a crystal structure containing a body-centered cubic structure as a single or main phase and made of a composition represented by the general formula $Ti_aCr_bMo_cFe_d$, in which a is in a range of from 25 to 45 % by atomic weight, b is in a range of from 30 to 65 % by atomic weight, c is in a range of from 5 to 40 % by atomic weight, and d is in a range of from 0 to 15 % by atomic weight. In production of the alloy, a heat treatment is performed at a temperature in a range of from 1,200 to 1,500°C for 1 minute to 24 hours and then cooling is performed at a speed equal to or higher than the cooling speed obtained by water cooling.